BOOK NOTICES

Indiana Climate

Isaiah Bowman in an address at one of the recent meetings has declared that "facts more valuable than all the gold of the Klondike lie hidden in the climatological records of the Weather Bureau." Whether or not it might be further remarked that an equally valuable set of climatic facts are overlooked or obscured by Weather Bureau methods of taking and recording data, does not detract at all from the vast store of climatic data Professor Stephen S. Visher has compiled and summarized from Weather Bureau records in a book titled "The Climate of Indiana."

That Professor Visher has sought out so much of the hidden value in the records is obvious at a glance. That he recognizes certain limitations of Weather Bureau records is clear through study of his work. The 27-chapter book contains 70 tables and almost 500 figures, 400 of which are maps of Indiana which emphasize various aspects of the state's climate. Moreover, these are not the conventional presentations of averages and extremes, but presentations of data that may be utilized by workers in biology, geography and other fields. That it is not simply calculation for calculation's sake may be judged from the following types of data which he has mapped: Days per decade during which temperature was continuously below 10°; percentages of Junes, Julys, Augusts which have had less than 1½″ of rain; times per 40 years that the crop-growing season was humid, moist sub-humid, dry; January, February, March, etc., 2-day rains of 2 inches or more per decade; normal date of beginning of corn planting; average number of days per year with maximum temperatures below 32°. These are only a few samples of many.

The thoroughness of Professor Visher's research cannot be told in little space but is suggested by the chapter titles. Chapter 1 is a general discussion of Indiana climate, and more or less of a summary of the next 15 chapters. These deal specifically and in meticulous detail with weather phenomena such as temperature—average, high and low; killing frosts; precipitation—normal and near normal, drouths, especially wet months and seasons, snowfall, rainfall intensity, hail and floods; humidity; sunshine and clouds; winds; thunderstorms, lightning, tornadoes. Contrasts of seasonal weather and seasonal weather types are discussed in two chapters.

In Chapters 19 to 24, climate is discussed with relation to physiography, crops, and health. One chapter is devoted to classifying Indiana climate. He recognizes 3 general divisions, the western, central and eastern thirds, each section being further subdivided into 3 or 4 divisions

north and south. One chapter is devoted to the climate of Bloomington and the final one is given over to comparative climatic data from 6 widely scattered stations.

The effects of climate on Indiana topography is an interesting summary, for climatic elements—wind, water and ice—have all played significant roles in the development of Indiana scenery. That the author is cognizant of the fact that the Weather Bureau methods and compilations obscure certain vital extremes in local areas is shown in his discussion of the effects of physiography on climate, although the treatment is brief and data fragmentary. His analysis of factors affecting crop plants is much more thorough and certainly more functional than most statements made by ecologists and weather bureau analysts themselves.

Professor Visher has obtained most of what is obtainable from Weather Bureau records for a region the size of Indiana. To this reviewer's knowledge it is more than anyone else has ever done for an area of similar size.

It is unfortunate that such an excellent work necessarily had to be based on data compiled on the conventional static monthly basis. Otherwise, seasonal contrasts, wet periods, drouths and other periodic events might have been better emphasized and compared. For example, it is difficult to compare percipitation phenomena of 28-day Februaries with 31-day Marches. Wettest 30 days, or driest 30 days, on the basis of long records or for individual years, are seldom, if ever, limited to the period between the first and last day of a given month.

What Deam has done for Indiana flora, Visher has matched in his treatment of the climate of Indiana. To investigators in fields where climatology is an essential adjunct, this work will prove valuable reference—not only for its information, but for its presentation, selection and analysis of date.—*John N. Wolfe.*

The Climate of Indiana, by Stephen S. Visher. 511 pages, 492 figures and 81 tables. Indiana University, Bloomington, Indiana, 1945. $4.00.

Infrared and Raman Spectra

Infrared and Raman Spectra of Polatomic Molecules is the third in a series of books on atomic and molecular spectra by Professor Herzberg. The first concerns itself with atomic spectra alone, while the second on *Diatomic Molecules* is really Volume 1 of the series on molecular spectra. The present volume on Polyatomic Molecules deals with Infrared and Raman Spectra from the points of view of both theoretical treatment of molecular models and the interpretation of experimental data on these models. This book is indispensable to both the beginner and to the man doing independent research in the field of molecular structure. Professor Herzberg has combined an elementary treatment of the problem of the vibration and rotation of molecules with a more advanced point of view. The text material is illustrated with many cases taken from the literature on the subject. Throughout the book are a number of fine print sections which may interest only the specialist, and which may be omitted by the beginner without the loss of continuity. The principal value of the book to the specialist is that it contains at least a thumb nail treatment of most of the molecular types known and extensive tables of both experimental and calculated data. The tables and bibliography are very well cross-referenced, so that where the treatment is not complete the original papers may easily be found. Professor Herzberg has recalculated many constants to fit a more uniform terminology, similar to that used in his *Diatomic Molecules*. The Introduction contains a treatment of Group Theory which should be found useful to many who have no previous knowledge of the subject.

Chapter I gives a general introduction to the subject of Linear, Symmetrical Rotator, Spherical Rotator, and Asymmetrical Rotator molecules in which energy levels, formation of spectra and intensities, are discussed.

In Chapter II, Professor Herzberg deals with the general problem of vibrating systems of particles. Considerable space is devoted to symmetry types of the normal vibrations in a great many molecules. Applications to several specific models, notably, linear and non-linear XY_2, and pyramidal XY_3. The subject of anharmonicities, and isotope effect are also treated.

Chapter III considers the Vibrational Infrared and Haman Spectra from both a Classical and Quantum Mechanical point of view. Following this are specific applications to a great many well-known molecules—CO_2, CS_2, H_2O, C_2H_2, etc.

The problem of the interaction between rotation and vibration is treated in Chapter IV. Combination relations which lead to the calculation of some of the molecular constants are developed. Various models are considered separately with discussions of their band appearance.

Chapter V contains applications of much of the foregoing material to the calculation of thermodynamic quantities.

Infrared and Raman Spectra of Polyatomic Molecules, by Gerhard Herzberg. xiii+632 pp. Fig. 174. 1945. D. Van Nostrand Company, Inc., New York. $9.50.—*Alvin H. Neilsen.*